NASA's Glenn Research Center's Impact in Ohio from Partnerships and Technology Transfer

You know that NASA studies our planet, our sun, our solar system, and our Universe. But did you know about the space program's impact here on Earth?

Glenn Research Center's Technology Transfer and Partnership Office (TTPO) is dedicated to forming partnerships that can positively contribute to—and benefit from—NASA's research and development (R&D) and technology innovations. Read on to learn more about our impact in Ohio, or contact us for more information.

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impact in ohio

Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)

NASA's SBIR/STTR Program provides an opportunity for small high-tech companies (500 employees or less) to participate in NASA-sponsored R&D efforts in key technology areas. In STTR projects, the small business collaborates with a research institution, such as a university.

Since 1983, NASA's SBIR/STTR Program has invested **$64.1 million** in Ohio's small companies.

NASA's SBIR investments in Ohio totalled **$5.1 million** in 2008.

SBIR funding has helped companies attract additional funding totaling **$750,000** in 2008 and **$2 million** in 2009.

These Ohio businesses currently participate in NASA's SBIR/STTR Program (Phases 1 and 2).

Company	Ohio location
Alphaport, Inc.	Cleveland
Cornerstone Research Group, Inc.	Dayton
Hyper Tech Research, Inc.	Columbus
Innovative Scientific Solutions, Inc.	Dayton
NTI, Inc.	Fairborn
Orbital Research, Inc.	Cleveland

Company	Ohio location
RNET Technologies, Inc.	Dayton
Spectral Energies, LLC	Dayton
SynGenics Corporation	Delaware
UES, Inc.	Dayton
Wright Materials Research Co.	Beavercreek
ZIN Technologies, Inc.	Middleburg Heights

The following Ohio companies recently received additional funding (Phase 3), totaling $1.2 million, to apply their technologies to the aeronautics and space programs.

Company	Technology/Product
A&P Technology Cincinnati	Affordable composite fan containment case with integral toughening elements
Sierra Lobo Fremont	Reduced-gravity testing and analysis of Cryo-Tracker® Mass Gauging System, a "gas gauge" for cryogenic fluids
WebCore Miamisburg	Advanced composite materials/sandwich structures for use in supersonic jet engine fan containment cases

Cryo-Tracker is a registered trademark of Sierra Lobo.

Spinoffs to Ohio Companies*

Innovative technologies from NASA's space and aeronautics missions can be used in other ways that benefit society. Therefore, NASA is committed to "spinning off" its innovations into new products—as well as providing access to its technologies, facilities, and expertise. Many more amazing spinoff stories, like the following, appear in NASA's yearly *Spinoff* magazine (available at: http://www.sti.nasa.gov/tto).

NASA's Glenn Research Center has contributed core technologies to nearly 200 "spinoff" products. Inventions born in aeronautics and space research have found new life in consumer goods and other areas of our lives. *Spinoff* magazine has tracked more than 60 Ohio companies whose products have benefited from collaboration with NASA.

Advanced Coatings International (Akron)
This company prototyped the platform chemistry for a polyimide-based, waterborne, liquid photoimagable coating, ideal for the manufacture of printed circuit boards. The Polymers Branch at Glenn contributed its extensive knowledge of polyimide chemistry and expertise in the synthesis of ultraviolet light-curable polyimides, critical components in this technology's development.

ZIN Technologies (Middleburg Heights)
ZIN Technologies and Glenn have received a 2009 Northeast Ohio Technology Coalition (NorTech) Innovation Award for their work on BioWATCH (Biomedical Wireless and Ambulatory Telemetry for Crew Health) that was initiated with an SBIR award in 2004. ZIN delivered a spaceflight-ready BioWATCH to NASA in 2007 for use in monitoring astronaut health. ZIN subsequently teamed with the Cleveland Clinic's Lerner Research Institute to develop the commercial biomedical capabilities of BioWATCH into their patent-pending vMetrics product. The company received development funding from sources such as the John Glenn Biomedical Engineering Consortium and Cleveland State Transitional Validation Fund. ZIN Medical has been formed to continue the development of vMetrics, which can simultaneously monitor such diverse medical conditions as congestive heart failure, hypertension, diabetes, stroke, myocardial infarction, and sleep apnea as well as be used for vertebral artery dissection monitoring and general physical wellness.

**Publication herein does not constitute NASA endorsement of the product or process, nor confirmation of manufacturers' performance claims related to any particular spinoff development.*

Other Ohio Partnerships

Glenn's TTPO also seeks out other collaborations with commercial, academic, and government entities to ensure quick and cost-effective development of space program technologies while helping to meet the goals of our non-NASA partners. Current partnerships with Ohio organizations are described below.

Goodyear Tire and Rubber Company (Akron)
Physical testing is underway for high-load tires, fabricated as a result of collaborations between Goodyear and the Human Robotic Systems project at Glenn. Glenn and Goodyear are working to understand types of lunar and Earth vehicles that can use the wire mesh, airless/rubberless tires developed in the 1960s for the Apollo Lunar Roving Vehicle. The partners are developing new tools to model, build, and test several prototypes to support future exploration of the Moon and Earth-based automobiles.

Parker Hannifin (Cleveland)
The Glenn–Parker Hannifin partnership, which also involves Aspen Aerogels, has demonstrated the ability to mass-produce a polymer cross-linked aerogel and apply an aerogel as thermal insulation. Aspen Aerogels has designed an affordable and environmentally safe production process that will advance the technology's readiness for space. As part of the partnership, Parker Hannifin has demonstrated the polymer cross-linked aerogel's thermal insulation capability, in its refrigeration products and transfer lines.

Wright-Patterson Air Force Base (Dayton)
Researchers at Glenn partnered with their Air Force Research Laboratory (AFRL) neighbors to assess alternative fuels for commercial aircraft engines. The project team, which also involved Pratt & Whitney (P&W) and NASA's Langley Research Center, evaluated the potential impact of alternative fuels on engine combustor performance and emissions. The team successfully ran various fuel blends through P&W combustors, yielding lower particulate matter emissions compared to pure conventional jet fuel, with no adverse impact on the combustors. Glenn and P&W plan additional collaborations to continue this work with AFRL as well as with commercial partners. These collaborations may result in more environmentally friendly commercial aircraft operations here on Earth and a reduction in U.S. dependence on foreign oil.

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